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Why don't mathematics teachers use instructional technology and materials in their courses?

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Abstract

The purpose of this study is, to examine and investigate why mathematics teachers don't use instructional technology and materials in their mathematics courses. In this study negative effects resulting from the use of materials and reasons of why teachers don't use instructional technology and material in their courses are determined. Case study method was carried out with nine teachers rarely use technologies and materials, working at different schools in Trabzon. It is determined that the most important reason of not using instructional technology and material is growing out of students and teachers don't feel enough themselves for using of instructional technologies and preparing materials.

Keywords: Mathematics education, teachers' views, instructional technology, material,efficiencies of teachers

1. Introduction

Like everything else in the universe instructional institutions is affected by the technological advances and changes. According to Çelik (2007), using tools and equipments in education creates an effective teaching and learning atmosphere and has an important role in programme's reaching to success (Akt.: Kurtdede Fidan, 2008). Therefore, education should be based on the newest instructional technology and tools-equipments fit for the purpose (Kurtdede Fidan, 2008). Because, education system sometimes remains incapable of educating the qualified individuals that societies need. In order to overcome this problem, making teaching-learning process more productive, providing the students to learn more permanent, that's to say, the use of technology in education so as to educate qualified individuals must become widespread. Although the use of technology in education doesn't solve all problems encountered, it has potential to solve many of them (Çelik ve Kahyaoğlu ,2007). Using of materials in education creates an effective teaching and learning atmosphere and has a crucial role in order to help students achieve the anticipated aims and succeed in program run. This situation is very important for an effective teaching and learning (Karamustafaoğlu, 2006).

In as much as, learning environments containing visual and auditory equipments that focus on many senses and help permanent learning occur contributes the students to substantially comprehend the things learnt better (Dursun, 2006; Akt. Kurtdede Fidan, 2008).While a teaching and learning environment to be appealed to many more senses is being created; it is inevitable to benefit from instructional technology and materials. When looked at literature about

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this matter, it is seen that these studies head to teachers' ideas for the use of instructional technologies and materials, whether or not they make a contribution to students' learning-understanding and teaching of the course, the comparison of teachers and teacher canditates' opinions about instructional technologies, opinions of teachers' about the usefulness of instructional technology and materials course that is learned in education of teachers, teachers' and teacher canditates' attitudes towards to technology (Taşçı, Yaman ve Soran, 2010; Karamustafaoğlu, 2006; Kurtdede Fidan, 2008; Baki v.d, 2009; Gömleksiz, Serhatlıoğlu ve Kan, 2010;Yıldırım, 2008; Paprzychi, Vikovic & Pierson, 1994; Hardy, 1998). In these studies, it is generally realized that positive sides of the use of instructional technologies and materials On the other hand, in this study, besides the advantages of utilization from instructional technologies and materials in the courses, it has been worked on to determine what the negative sides of it can be, which reasons underlying the nonuse of any instructional technologies and materials are. In accordance with this purpose, the problem of the research has been defined as "Why aren't mathematics teachers using instructional technologies and materials in their courses?". Sub-problems are as follows:

i) What are the situations and cases having an effect on nonuse of instructional technologies and materials in the courses according to mathematics teachers?

ii) How do the mathematics teachers feel about preparing materials and using instructional technologies in mathematical classes? Proficient or not?

iii) What are their points of view relation to the process of using them and preparing materials?

2. Method

The primary purpose in this study is to define the situation in detail, express, make evaluations in the direction of standards and reveal the probable relationships between cases/events. So, situational study has been used.

2. 1. Participants

This study was carried out by nine mathematics teachers working in different elementary schools in Trabzon. The research was intended to be carried out by many more teachers working in different schools. Both purposeful and easy to reach sampling was chosen.

2.2. Data collection tools

Data collection tool of the research is semi-structured interview conducted by participant teachers. 7 interview questions have been determined as a result of literature review and by being taken expert opinion. 5 of these questions were prepared in order to ascertain the underlying problems of that mathematics teachers don't use instructional technologies and materials, 1 of them so as to ascertain which level they feel proficient at about preparing materials and using instructional technologies in their courses and also 1 of them to find what they think about the process of instructional technologies and material preparation and how they evaluate them.

2.3. The implementation of data collecting tools

Before interviews, the study were presented to the participant teachers and their approvals for their participation to the research were received. Then, it was expressed how long the interview could last, how many questions there would be and a suitable time for interview was specified. In that the participants should be more relax and honest in the interviews, it was said that their names would not be announced and used. It was also said that written interviews and the findings obtained would not be used until they controlled them.

2.4. Data analysis

Before interview, the participants were asked about whether or not they want voice record and according to their requests, the interview was recorded or short notes were taken during the interview. Right after the interview, it was written. As said in advance, when interviews were written, an interview report including interviews and the things

understood from the interviews was presented to the participants and it was had accuracy of information obtained approved. Consequently, reliability of the research was increased.

Later, the approved data were revised; analyzed and first level codes were made by 2 researchers. Notes indicating which aim they were codified with were taken next to the codes and afterwards, these first level codes were brought together under themes. While themes were being created, it was paid attention to convenience of the codes theme contains to theme and other codes in theme. The researchers argued about these codes and themes. In consequence of arguments, common codes were presented in tables.

3. Results

3.1. Effective situations in nonuse of instructional technologies and materials in math classes as for math teachers

Effective situations in nonuse of instructional Technologies and materials in math classes according to math teachers have been summarized in Table-1. Data in table have been supported with direct quotations from interviews.

Table 1. Effective situations in nonuse of instructional Technologies and materials

THEMES	CODES	OPINION PRESENTER
Current Education System	Time problem	(t1,t3,t5,t6,t7,t9)
	Inconsistency with testing system	(t4,t8)
	Inconsistency between theory and implementation	(t8)
	Acquisition, material, activity inconsistency	(t3)
Student	Just focusing on material	(t1,t4,t7,t9)
	Dramatization of material	(t1,t3)
	Incomprehension of the aim of the material	(t1)
	Student's negative approach	(t2,t4,t6,t8)
	Not internalization	(t2,t4)
	Effect difference that material created	(t1,t4,t7,t9)
	Distractibility	(t4,t9)
	Student Personality	(t1)
Teacher	Negative beliefs and opinions about instructional Technologies and materials	(t1, t2,t5,t6,t7,t8)
	Density	(t3,t9)
	Inability in implementation	(t6,t9)
	Anxiety about being able to incomplete program	(t3,t5,t6,t7)
Learning and Teaching Environment	Being heterogeneous of class in terms of student level	(t1,t3,t4, t5,t6,t8,t9)
	Deficiency of materials	(t1,t3,t6)
	Class size	(t1,t2,t4)
	Problems in implementation	(t1)
	Lack of environment	(t2,t3,t4,t6, t8,t9)
	Communication problem	(t2)
	Difficulty in classroom management	(t3,t4,t7,t8)

Learning and Teaching Period	Negative influence of using technology and material on the course	(t1)
	Subject's not being suitable for using material	(t1,t2,t3,t4,t5,t6,t7,t8,t9)
	Difficulty in evaluation of course	(t1)
	Not be able to make students active continuously	(t1)

Teachers have touched on time problem under the correct teaching and learning theme. They said the following statements while mentioning this problem:

…….. However, I brought algebra squares into the class for identity subject in 8th class. Time is very important in such situations. Curriculum gives 10 hours to this subject, but this time is too short. (t3).

…… Time is the biggest and most serious problem. As I mentioned before, 2 hours were given to the acquisition of two differences sums in the curriculum. (t1)

Teachers have just dealt with focusing on material and effect difference that material caused under the student theme. They articulated this problem in the interviews as follows:

*……..While using material sometimes affects the student positively, and sometimes, it can affect in a negative way. For example, three-dimensional objects which I used in teaching of prism affected them to learn in a positive way. We always talk about algebra squares, but I think that students would have understood better if I had not used those algebra squares I used in identities and had given that subject literally. They could have learned in a shorter time. Also student will make an effort so much. She/he will make that result in square of totals. The square of first one, the square of the second one and sum two times of their multiplations. (*t1)

3.2. Teachers' ability levels for using instructional technologies and preparing materials

In accordance with the findings obtained from interviews, t1,t3,t4,t6,t9 relatively feel confidence and qualified in using instructional Technologies and preparing material ; t5,t7,t8 do not feel confidence, as for t2 , he/she mentioned that he/she feels confidence and qualified. Some teachers' opinions are as follows:

…… Of course, I do not completely feel confidence. Preparing material is a new thing even in our university program. We are normally inexperienced in implementation of a new-learnt subject. .Because we were not taught by such ways. We did not have such an education in our own studentship, too. (t7)

3.3Teachers' viewpoints to using instructional technologies and preparing material process

9 teachers' viewpoints and definitions of process of using instructional technologies and preparing material are specified in the table below:

Table 2. Teachers' viewpoints to using instructional technologies and preparing material process

THEME	CODES	OPINION PRESENTER
Teachers' viewpoints 1to using instructional Technologies and preparing material process	Requiring preliminary	(t1,t9)
	Time consuming	(t1,t3,t4,t5,t7,t8,t9)
	Requiring planning	(t1,t3,t7)
	Exhausting	(t2,t3,t4,t5,t7,t8,t9)
	Requiring to master the subject	(t2,t4)
	Boring	(t2,t3)
	Requiring materiality	(t2,t6,t9)
	Trying	(t3,t6)
	Thought-provoking	(t7)

Some teachers have defined the process as the one requiring preliminary.

……..I will again give an example of algebra squares. While we were applying algebra squares, we divided the class into 8 groups. That means that it is necessary to create 8 different materials. (t1)

…….Extra time is necessary to create material. Also preliminary is needed before coming to class .In this respect, difficulties are occurring.(t9)

Some have mentioned that it is s time consuming process.
……Moreover, if you square two in that material, it means 32 parts of materials as there are 4 parts and 8 groups. *In some cases, parts is not enough. Therefore we had to cut.(t1)*
…… you square two in that material, it means 32 parts of materials as there are 4 parts and 8 groups. In some cases, parts is not enough. Therefore we had to cut. Everything must be planned very well. So such troubles do not come up. (t1)

4. Discussion

Similar to the findings of Taşçı,Yaman and Soran (2010)'s study with biology teachers, math teachers have difficulties in the finding the material et the appropriate level for students, ensuring the control of course when using materials, collecting the students' attention on course. To overcome this problem, it is needed to develop materials that appropriate for different levels of students and applicable to various groups in the same period of the time.

Karamustafaoğlu (2006) found that science and technology teachers indicate that they have positive attitude for preparing and using materials, but observations on this subject showed that they don't take enough responsibility. In this study it is recognized that mathematics teachers think that using of materials aren't useful for some courses. For the use of instructional technology and materials primarily teachers' attitudes towards them need to be replaced.

Taşçı, Yaman and Soran (2010) found that teachers who took development of instructional technology and materials course use technology in theirs courses more commonly. Development of instructional technology and materials course for teacher candidates and in-service training should be arranged and increased in parallel with developments in instructional technology.

5. Conclusion and recommendation

As a result of the study, the leading causes that elementary mathematics teachers do not use the instructional technologies and materials in math classes are defined as current education system, teacher, student, learning environment and teaching-learning process. In the light of the obtained findings, the students are the most important factor causing that teachers don't use them in their classes. Furthermore, teachers have mostly touched on current education system based time, student-based focusing on just material, teacher-based negative beliefs and opinions, learning environment-based heterogeneity of the class, process-based inconvenience of the subject to the material.

Following the study, majority of the teachers define the preparation of instructional technologies and material process as time consuming and exhausting and they do not feel confidence in using and preparing them.

Mathematic course has the problem of inconsistency between the content and duration of instruction in the curriculum like in the other courses. Teachers think that if they use instruction technology and material, courses become longer. This wrong belief can be corrected as providing effective materials that can apply in a short period of time.

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